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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/522,294	03/09/2000	Manabu Kato	35.C14341	3313

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EXAMINER

PHAM, HAI CHI

ART UNIT PAPER NUMBER

2861

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/522,294

Applicant(s)

KATO, MANABU

Examiner

Hai C Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 12-18, 40 and 42-79 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-10, 56, 63, 67 and 74 is/are allowed.
- 6) ☒ Claim(s) 12-18, 40, 42-55, 57-62, 64-66, 68-73 and 75-79 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/03/03</u> . | 6) <input type="checkbox"/> Other: ____. |

FINAL REJECTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 40, 42-43, 48-50, 55, 58-59, 65-66, 70-71, 72-73, 77-79 are rejected under 35 U.S.C. 102(b) as being anticipated by Kitamura (U.S. 4,424,442).

Kitamura discloses a multi-beam scanning apparatus comprising light source (1) having a plurality of light emitting sections (1a, 1b, 1c), a light deflector (polygon mirror 3) for deflecting a plurality of light beams emitted respectively from the plurality of light emitting sections of said light source, a scanning optical system (f- θ lens 4) for focusing the plurality of light beams deflected by said light deflector on a surface to be scanned (surface of the photosensitive drum 6), a photodetector (5) for controlling a timing of a start of scanning of the plurality of light beams by detecting at least one of the plurality of light beams deflected by said light deflector as at least one detection light beam, and a detection optical element (detection cylindrical lens 10) for converging the at least one detection light beam and leading it to said photodetector (see Fig. 4A), said detection optical element having a refractive power in the main-scanning direction (in one embodiment wherein the light beams enter the photodetector without passing through the scanning imaging optical element 4, the detection cylindrical lens 10 would be

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replaced by an anamorphic optical element having different powers in the main and sub-scanning directions) (col. 2, lines 21-30), wherein said detection optical element has its optical surfaces arranged orthogonally relative to an arrangement direction of the at least one detection light beam (in either cases, the detection cylindrical lens or the anamorphic optical element having the optical axis 11 coincident with the primary scanning direction and parallel to the principal rays of incident lights 3a, 3b, 3c, which are orthogonal to the surfaces of the detection lens) (Figs. 4A and 4B) (col. 3, lines 17-35).

With respect to claims 40, 43, 48, 50, 55, 58-59, 65, 70-71, 73, 77-78, Kitamura further teaches the detection optical element (10) comprising an anamorphic lens wherein at least one detection light beam does not pass through any optical element having a surface not orthogonal to the direction of the detection light beam and specially the at least one detection light beam does not pass through the scanning imaging optical element (4) (col. 2, lines 21-30), at least one image carrier (photosensitive drum 6) being arranged on the at least one surface to be scanned, an incident optical system (2) for leading the plural beams to the light deflector, as well as all the plural beams being detected by the photodetector.

With regard to claims 49, 66, 72, and 79, Kitamura further teaches the photodetector (5) being provided on the same plane as the surface scanned by the light beams, indicating that the photodetector and the center of the scanned surface being held optically equivalent (col. 2, lines 3-5).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 12-13, 18, 57, 64, 68-69, 72, 73, 75-76, 79 rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Ohmori et al. (U.S. 4,978,977).

Kitamura discloses all the basic limitations of the claimed invention except for two lenses being disposed in front of the photodetector.

However, Ohmori et al. discloses a laser scanning apparatus, which comprises an SOS sensor (10) for determining the start of scanning position of the laser beam is held equivalent to the surface of the photosensitive member (8), a first cylindrical lens (11) and a second cylindrical lens (12) disposed in front of the SOS sensor for converging the detection beam onto the surface of the SOS sensor, the surfaces of the two lenses being held orthogonal to the principal ray of the detection beam (Fig. 4). Ohmori et al. also teaches the second cylindrical lens (12) being replaced by a usual condenser lens having power in both scanning directions (col. 3, lines 55-68).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the pair of detection lenses as taught by Ohmori et al. in the device of Kitamura. The motivation for doing so would have been to

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precisely focus the detection beam onto the sensor as well as to diminish synchronization error as suggested by Ohmori et al.

5. Claims 15, 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Ohmori et al., as applied to claims 12, 49 above, and further in view of Kamikubo (U.S. 6,124,962).

Kitamura, as modified by Ohmori et al., discloses all the basic limitations of the claimed invention except for the scanning optical system comprising a refraction optical element and a diffraction optical element, and the light beams having different wavelengths.

However, Kamikubo discloses a scanning optical system whose scanning lenses comprise refraction lens elements with a diffraction lens structure for compensating compensates for the lateral chromatic aberration caused by the refraction lens elements. Kamikubo further teaches the scanning optical system would include a plurality of light sources emitting lights at different wavelengths.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the refraction and diffraction lens elements as taught by Kamikubo in the modified device of Kitamura. Doing so would eliminate the chromatic aberration when a light source emitting a plurality of light beams of different wavelengths are used.

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6. Claims 45, 52, 61-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Kamikubo.

Kitamura discloses all the basic limitations of the claimed invention except for the scanning optical system comprising a refraction optical element and a diffraction optical element.

However, Kamikubo discloses a scanning optical system whose scanning lenses comprise refraction lens elements with a diffraction lens structure for compensating compensates for the lateral chromatic aberration caused by the refraction lens elements. Kamikubo further teaches the scanning optical system would include a plurality of light sources emitting lights at different wavelengths.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the refraction and diffraction lens elements as taught by Kamikubo in the device of Kitamura. Doing so would eliminate the chromatic aberration when a light source emitting a plurality of light beams of different wavelengths are used.

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Ohmori et al., as applied to claim 12 above, and further in view of Kanoto et al. (U.S. 5,365,259).

Kitamura, as modified by Ohmori et al., discloses all the basic limitations of the claimed invention except for the detection optical element being made of a plastic material.

However, Kanoto et al. discloses a scanning optical device comprising a detection optical element (24c, Fig. 7) for converging the deflected laser beam toward the start of scan photosensor (11), the detection lens being disposed orthogonally relative to the deflected laser beam, and being integral to the scanning lens (24), both being made of a plastic material.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide detection lens made of plastic as taught by Kanoto et al. in the modified device of Kitamura. By doing so, it is possible to provide a light and compact optical scanning device.

8. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Ohmori et al. and Kamikubo, as applied to claims 12, 15 above, and further in view of Kanoto et al.

Kitamura, as modified by Ohmori et al. and Kamikubo, discloses all the basic limitations of the claimed invention except for the detection optical element and the scanning lens being integrally formed and being both made of a plastic material.

However, Kanoto et al. discloses a scanning optical device comprising a detection optical element (24c, Fig. 7) for converging the deflected laser beam toward the start of scan photosensor (11), the detection lens being disposed orthogonally relative to the deflected laser beam, and being integral to the scanning lens (24), both being made of a plastic material.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Kitamura, as modified by Ohmori et al. and Kamikubo, with the aforementioned teaching of Kanoto et al. By doing so, it is possible to provide a light and compact optical scanning device.

9. Claims 44 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura, as applied to claims 42, 49 above, and further in view of Kanoto et al.

Kitamura discloses all the basic limitations of the claimed invention except for the detection optical element being made of a plastic material.

However, Kanoto et al. discloses a scanning optical device comprising a detection optical element (24c, Fig. 7) for converging the deflected laser beam toward the start of scan photosensor (11), the detection lens being disposed orthogonally relative to the deflected laser beam, and being integral to the scanning lens (24), both being made of a plastic material.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide detection lens made of plastic as taught by Kanoto et al. in the device of Kitamura. By doing so, it is possible to provide a light and compact optical scanning device.

10. Claims 46-47, 53-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Kamikubo, as applied to claims 42, 45, 49, 52 above, and further in view of Kanoto et al.

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Kitamura, as modified by Kamikubo, discloses all the basic limitations of the claimed invention except for the detection optical element and the scanning lens being integrally formed and being both made of a plastic material.

However, Kanoto et al. discloses a scanning optical device comprising a detection optical element (24c, Fig. 7) for converging the deflected laser beam toward the start of scan photosensor (11), the detection lens being disposed orthogonally relative to the deflected laser beam, and being integral to the scanning lens (24), both being made of a plastic material.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Kitamura, as modified by Kamikubo, with the aforementioned teaching of Kanoto et al. By doing so, it is possible to provide a light and compact optical scanning device.

Allowable Subject Matter

11. Claims 1-10, 56, 63, 67 and 74 are allowed.
12. The primary reason for the indication of the allowability of the above claims have been indicated in the previous Office action issued on 09/25/03.

Response to Arguments

13. Applicant's arguments filed 01/07/04 have been fully considered but they are not persuasive.

With regard to Applicant's arguments concerning Kitamura teaching in which the "cylindrical lens 10 is not seen to have a refractive power in a main-scanning direction", but "imaging lens 4 provides a refractive power in a main-scanning direction", the examiner would like to draw Applicant's attention to the disclosure of Kitamura at col. 2, lines 21-30:

"Although not described in the following embodiments, where the light beams enter the photodetector element from the deflector without passing through the scanning imaging optical member, an anamorphic optical element such as a toric lens having different powers in different orthogonal directions may be disposed in front of the photodetector element, whereby the light beams on the photodetector element can be focused in the primary scanning direction and defocused in the secondary scanning direction."

where Kitamura clearly distinguishes the anamorphic optical element from the imaging lens 4, wherein the anamorphic optical element, used as a detection lens placed in front of the photodetector, has at least a refractive power in a main-scanning direction since it is indicated that the refractive powers of the anamorphic lens are different in both main and sub-scanning directions.

Applicant further argues that "nothing in Kitamura is seen to disclose or suggest that the optical surfaces of the anamorphic optical element are arranged orthogonally, relative to an arrangement direction of the light beams detected by the photodetector element 5". However, the above excerpt of Kitamura clearly indicates that the anamorphic optical element would be used in the place of the cylindrical lens 10 as a detection optical element in that specific embodiment, and as such, the detection optical element is arranged such that the optical surfaces of the detection optical element are

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always orthogonal to an arrangement direction of the light beams detected by the photodetector element 5 as shown in Figs. 4A and 4B.

Applicant further argues that the combination of Ohmori with Kitamura is not proper, citing that “one o[f] ordinary skill in the art would not have been motivated to look to single beam scanning system described in Ohmori to solve problems in an optical system for a multiple beam scanning system such as the one described in Kitamura”, the examiner respectfully disagrees. In fact, Kitamura has analyzed the optical system for a single beam scanning system, which also uses a photodetector element for detecting the light beam for the purpose of timing the start of the scanning beam, and indicates that the optical system for a multiple beam scanning system would use the photodetector element for the same purpose as above in the condition that “the photodetecting surface of the photodetector element must have a sufficient size with respect to the secondary scanning direction” (col. 3, lines 13-16) in order to receive all the plural light beams. Therefore, one of ordinary skill in the art would have been motivated to look to the single beam scanning system described by Ohmori for its relevant teaching with respect to the detection optical system.

Applicant further argues that the applied references do not disclose or suggest the feature of the invention related to photodetector being held optically equivalent to the center of a scanning width in the main scanning direction on the scanned surface. However, Kitamura teaches the photodetector element (5) being provided on the same plane as the surface scanned by the light beams (col. 2, lines 3-5), indicating that the photodetector element and the center of the scanned surface being held optically

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equivalent since the equivalent optical distance would be defined as the length of the optical path of a light beam perpendicular to the light-receiving surface of the photodetector element and the scanned surface, respectively.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D Meier can be reached on (571) 272-2149. The fax phone

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number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM
PRIMARY EXAMINER

March 31, 2004